GH-ETP Comms Meeting
L-3 Communications

January 21-22, 2004

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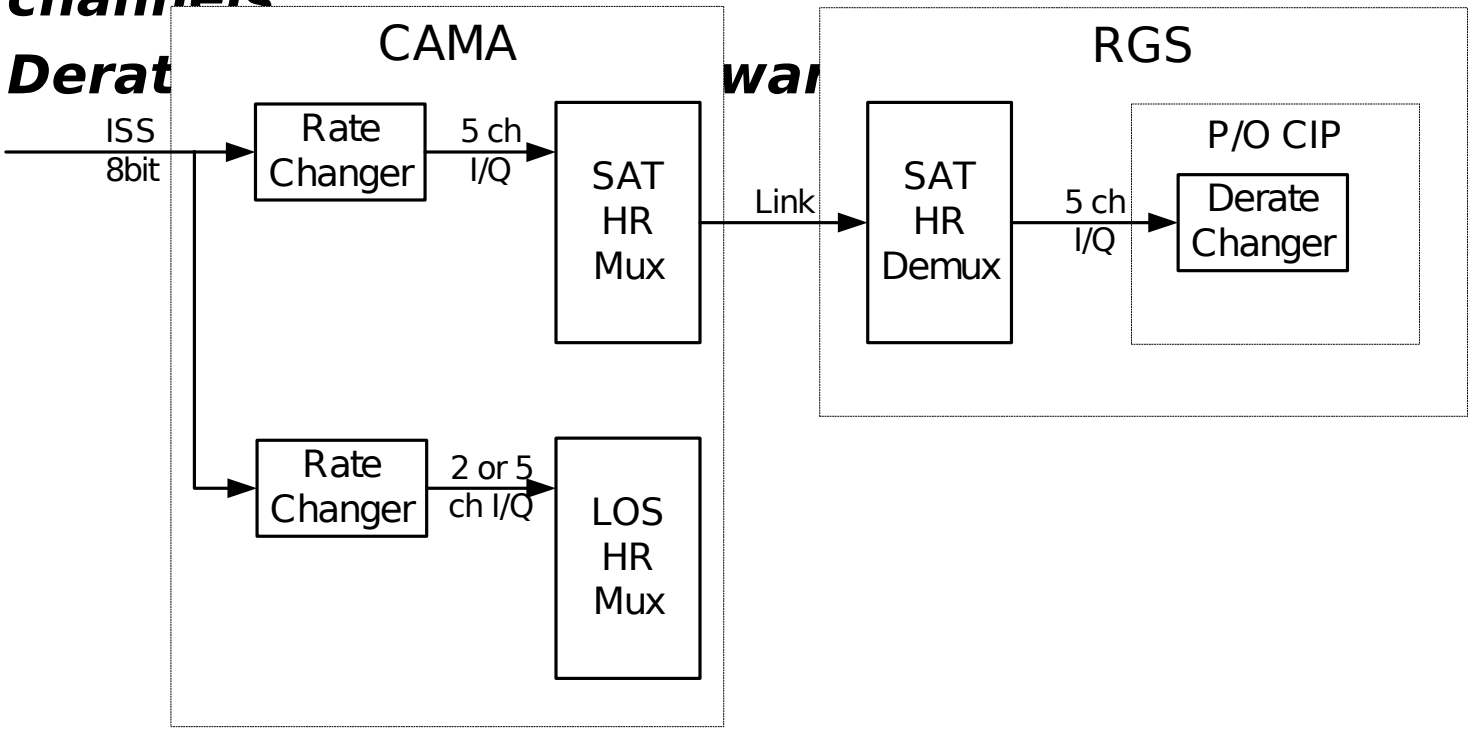
Agenda

- ***Sensor Data***
- ***AV C2/Status***
- ***AV Status Monitoring (CIP)***
- ***Audio***
- ***Situational Awareness***

Sensor Data Block Diagram

- ***ISS (or SMU or Recorder) outputs 8-bit parallel data***
- ***Sensor rate at 200 Mb/s***
- ***CAMA rate changes to the 5-42.84 Mb/s I2-Q3 channels***
- ***Derat… wa…***



Sensor Data

- ***L-3 build alternate rate changer frame***
- ***To assist NG CIP find a "larger sync"***
- ***Successfully tested in SLC GH lab 1/12/04***
- ***Building final software UCF***

- ***Developing Excel file for all Rate Changer formats***
- ***Show various Rate Changer frames***
  - 47.85, 40, 30, 20, 8.58 basic
  - 47.85, 40, 30, 20, 8.58 with 1Mb/s Telemetry
  - 46.14 CDL Recorder Playback
  - 200Mb/s – as delivered
  - 200Mb/s – grouped Fill Jan 2004
  - others

Sensor Data
200 Mb/s Rate Changer

Delivered 6/11/2002

	Qty	I2	I3	Q1	Q2	Q3
100 Bytes Long	1	Control	Data	Data	Data	Data
	5	Fill	Data	Data	Data	Data
	15	Data	Data	Data	Data	Data
	1	Data	Control	Data	Data	Data
	5	Data	Fill	Data	Data	Data
	14	Data	Data	Data	Data	Data
	1	Data	Data	Control	Data	Data
	4	Data	Data	Fill	Data	Data
	14	Data	Data	Data	Data	Data
	1	Data	Data	Data	Control	Data
	4	Data	Data	Data	Fill	Data
	14	Data	Data	Data	Data	Data
	1	Data	Data	Data	Data	Control
	4	Data	Data	Data	Data	Fill
	14	Data	Data	Data	Data	Data
	1	Data	Data	Data	Data	Data or Fill
	1	Sync	Sync	Sync	Sync	Sync

Tested 1/12/2004

	Qty	I2	I3	Q1	Q2	Q3
100 Bytes Long	4	Fill	Fill	Fill	Fill	Fill
	1	Fill	Fill	Data	Data	Data
	1	Control	Data	Data	Data	Data
	18	Data	Data	Data	Data	Data
	1	Data	Control	Data	Data	Data
	18	Data	Data	Data	Data	Data
	1	Data	Data	Control	Data	Data
	17	Data	Data	Data	Data	Data
	1	Data	Data	Data	Control	Data
	17	Data	Data	Data	Data	Data
	1	Data	Data	Data	Data	Control
	18	Data	Data	Data	Data	Data
	1	Data	Data	Data	Data	Data or Fill
	1	Sync	Sync	Sync	Sync	Sync

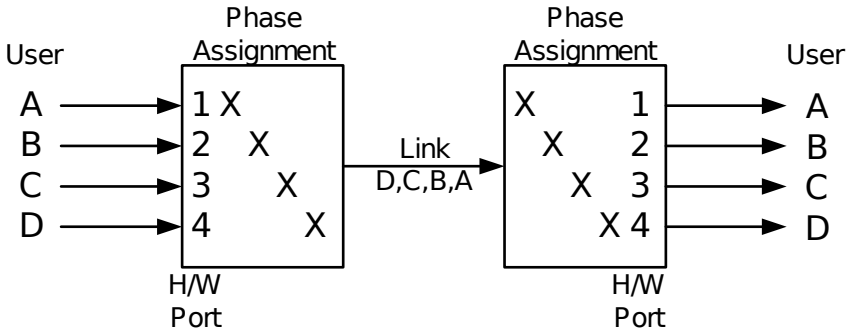
Sensor Data
200 Mb/s Frame Format

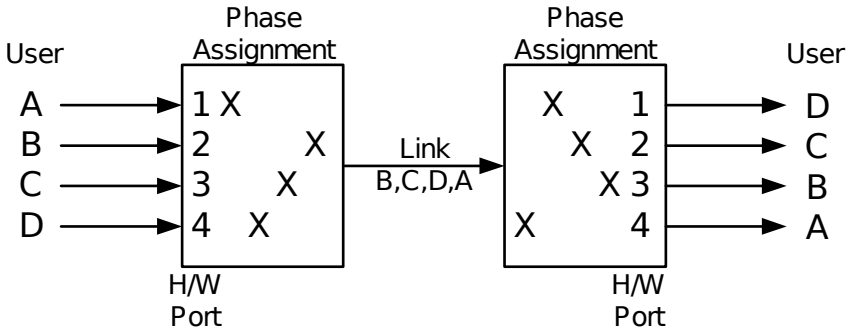
- ***Use I2, I3, Q1, Q2, Q3***
- ***500 bytes per frame***
  - 467 Data Bytes
  - 1 Data or Fill Byte (for Flow Control)
  - 5 Control Bytes
  - 22 Fill Bytes
  - 5 Sync Bytes
- ***Each block is 8 bits long – MS bit output first***
- ***Alternating Sync = 47 or B8 hex***
- ***Fill = AA hex***
- ***Control: 00 hex = Last Byte Fill***
  FF hex = Last Byte Data

  (Use majority vote of 5 Control Bytes to determine state of the last 'Data or Fill' byte)

AV C2/Status UCF

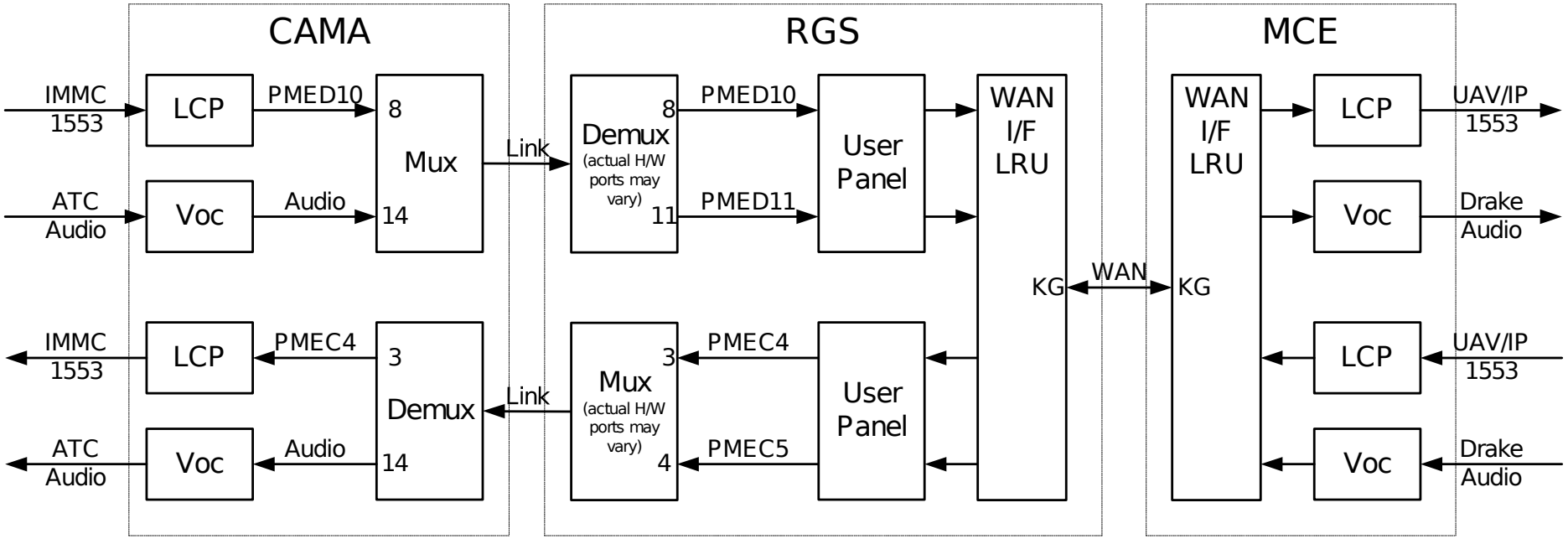
- ***Unique Configuration File (UCF)***
  - — Phase Map in each Mux and Demux
  - — Can easily assign user to needed input and output
  - — RGS to have specific GH UCF
  - — AICS to have new UCF to support ETP C2/Voice



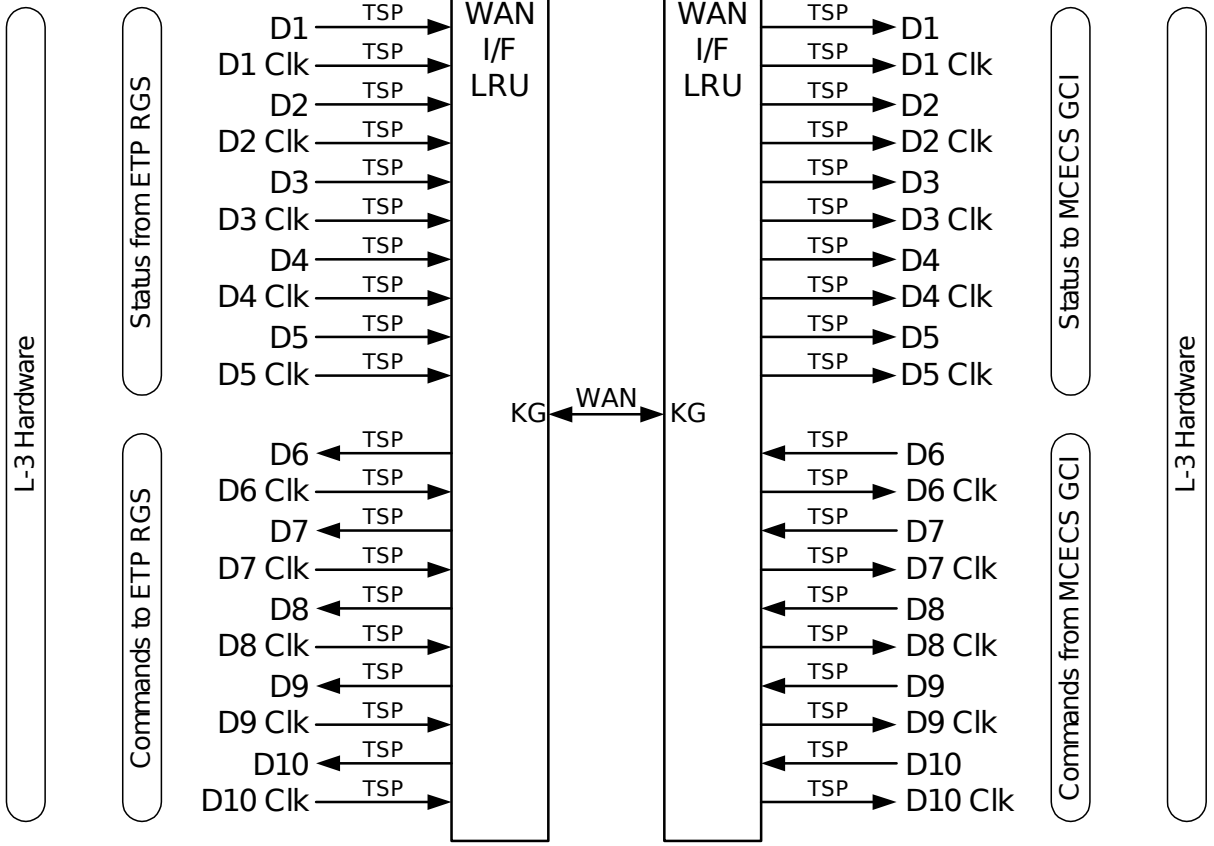


AV C2/Status Block Diagram

- ***C2/Status from AV to RGS – UCF change only***
- ***C2/Status from RGS to MCE***
  - — WAN Interface LRUs
  - — Cables
  - — Possible S/W in MCE/LCP (if long time delays)



AV C2/Status WAN I/F LRU



Synchronous
Low Latency
No lost bits
Encrypted
RS422 to ETP and GCI
Interface to WAN
5kbps to 4.6Mbps per channel

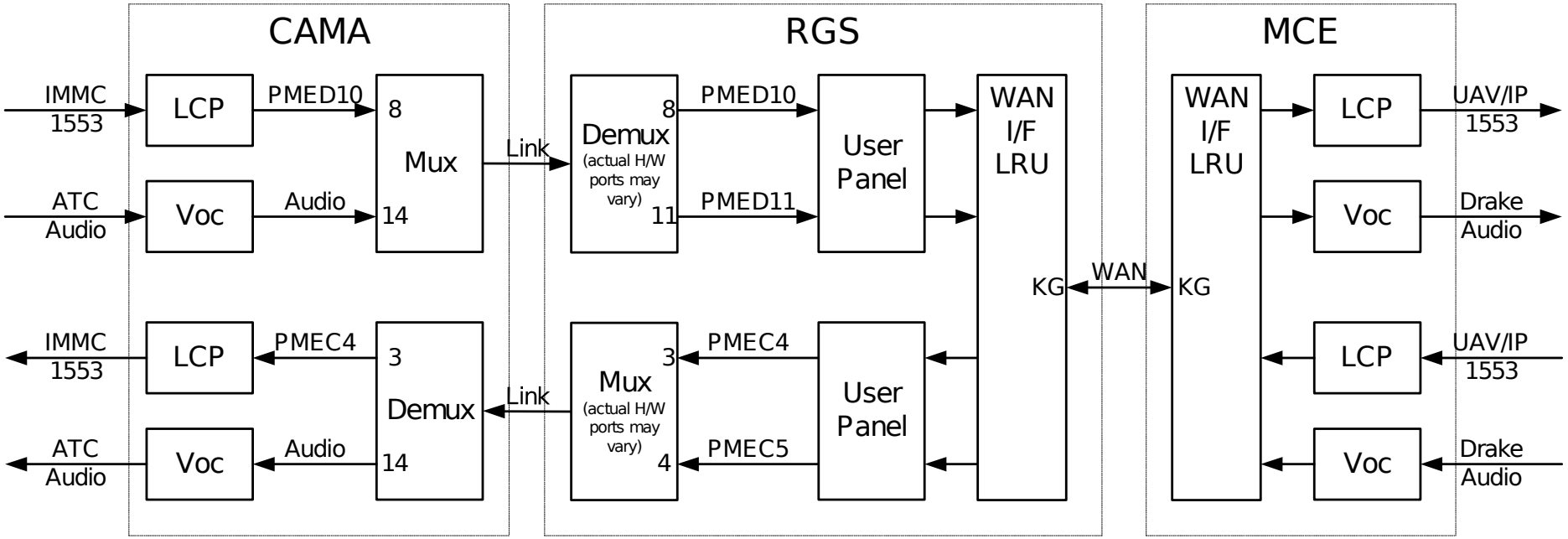
AV Status Monitoring (CIP)

- ***Frame format supplied to NG***
- ***CIP can monitor A/V status***
  - — When there is a full C2 link to the MCE
  - — Or AICS software mod to downlink Status w/o Command Link

Frame Format																
Word	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
1	Priority			Serial Number												
2				FF		IF	LH									
3	Word 1 or 17 UAV Status Packet (see the IDD)															
4	Word 2 or 18 UAV Status Packet (see the IDD)															
5	Word 3 or 19 UAV Status Packet (see the IDD)															
6	Word 4 or 20 UAV Status Packet (see the IDD)															
7	Word 5 or 21 UAV Status Packet (see the IDD)															
8	Word 6 or 22 UAV Status Packet (see the IDD)															
9	Word 7 or 23 UAV Status Packet (see the IDD)															
10	Word 8 or 24 UAV Status Packet (see the IDD)															
11	Word 9 or 25 UAV Status Packet (see the IDD)															
12	Word 10 or 26 UAV Status Packet (see the IDD)															
13	Word 11 or 27 UAV Status Packet (see the IDD)															
14	Word 12 or 28 UAV Status Packet (see the IDD)															
15	Word 13 or 29 UAV Status Packet (see the IDD)															
16	Word 14 or 30 UAV Status Packet (see the IDD)															
17	Word 15 or 31 UAV Status Packet (see the IDD)															
18	Word 16 or 32 UAV Status Packet (see the IDD)															
19	Confirmation Frame ID (L-3 Sliding Window Protocol use)															
20	CRC (L-3 hardware ASIC use)															
21	Sync (47 or B8)								Checksum							

Audio
ATC Audio

- ***Use separate channel***
- ***Avoid ETP net accidentally transmitted to clear ATC***
- ***Digital CVSD voice sent from RGS to MCE via WAN I/F LRU***



Audio
MCE Pilot

- ***ETP voice net via STU phones***
- ***STU phones in MCE***
- ***No L-3 involvement***

Situational Awareness

- ***Data from MCE***
  - — NG effort
  - — No L-3 involvement

- ***Data from Air Vehicle***
  - — L-3 formats GH navigation data in standard Nav Channel
  - — Next waypoint is not currently available at the AICS/CAMA
    - *Add to IMMC – CAMA Software Requirements Specification*
    - *Modify IMMC software*
    - *Modify CAMA software*